OHIO RIVER BASIN
STRAIGHT BRANCH RUN, INDIANA COUNTY

PENNSYLVANIA

ROSSITER DAM

NDI I.D. PA-1080
DER I.D. 032-019
OWNER: ROSSITER WATER COMPANY

PHASE I INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

PREPARED FOR

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, CORPS OF ENGINEERS
BALTIMORE, MARYLAND 21203

BY

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AUGUST 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Department of the Army, Office of Chief of Engineers, Washington, D.C. 20314.

The purpose of a Phase I investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of a dam is based upon visual observations and review of available data. Detailed investigations and analyses involving topographic mapping, subsurface investigations, material testing, and detailed computational evaluations are beyond the scope of a Phase I investigation. However, the Phase I inspection is intended to identify any need for such studies which should be performed by the owner.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of the dam depends on numerous and constantly changing internal and external factors which are evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway design flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. The spillway design flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

The assessment of the conditions and the recommendations were made by the consulting engineer in accordance with generally and currently accepted engineering principles and practices.

PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM

NAME OF DAM: Rossiter Dam
STATE LOCATED: Pennsylvania
COUNTY LOCATED: Indiana
STREAM: An unnamed tributary of Canoe Creek
SIZE CLASSIFICATION: Small
HAZARD CLASSIFICATION: High
OWNER: Rossiter Water Company
DATE OF INSPECTION: July 16 and July 31, 1981

ASSESSMENT: Based on the evaluation of existing conditions, the condition of Rossiter Dam is considered to be unsafe/nonemergency due to a seriously inadequate spillway capacity.

The overall condition of the dam is considered to be poor. The spillway structures have partially collapsed and the dam is overgrown with large trees and thick brush, precluding a complete inspection.

The spillway capacity was evaluated according to the recommended criteria and was found to be seriously inadequate. According to the recommended criteria, small dams in the high hazard category are required to pass from one-half to full Probable Maximum Flood (PMF). In view of the small size of the dam, one-half of the PMF was selected as the spillway design flood. Flood discharge capacity was evaluated according to the recommended procedure and was found to pass 20 percent of the PMF without overtopping the embankment. Since the spillway capacity is less than 50 percent of the PMF and results of a breach analysis indicate that the potential loss of life and downstream damage would be significantly increased due to a dam failure, the spillway is classified to be seriously inadequate.

The following recommendations should be implemented immediately:

1. The owner should immediately retain a professional engineer to conduct additional hydrologic and hydraulic studies to more accurately ascertain the spillway capacity and the nature and extent of improvements required to provide adequate spillway capacity.

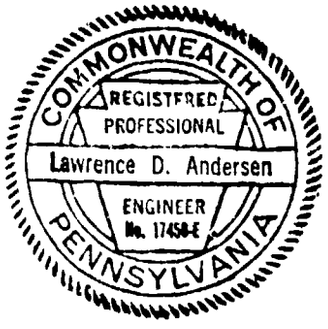
2. In conjunction with the above work, the spillway structure should be repaired.

3. Means should be developed to provide an upstream closure for the pipes through the embankment.

4. Trees and brush on the crest and downstream face of the dam and in an area 50 feet below the downstream toe should be cleared.

(5) Around-the-clock surveillance should be provided during unusually heavy runoff and a formal warning system should be developed to alert the downstream residents in the event of an emergency.

(6) The owner should develop a formal operating and maintenance plan for the dam, inspect the dam regularly, and perform the necessary maintenance.



Lawrence D. Andersen, P.E.
Vice President

August 26, 1981
Date

Approved by:

JAMES W. PECK
Colonel, Corps of Engineers
District Engineer

18 Sep 1981
Date

ROSSITER DAM
NDI I.D. PA-1080
DER I.D. 032-019
JULY 16, 1981

Upstream Face

Downstream Face

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PHASE I REPORT
NATIONAL DAM INSPECTION PROGRAM
ROSSITER DAM
NDI I.D. PA-1080
DER I.D. 032-019

SECTION 1
PROJECT INFORMATION

1.1 General

a. Authority. The inspection was performed pursuant to the authority granted by The National Dam Inspection Act, Public Law 92-367, to the Secretary of the Army, through the Corps of Engineers, to conduct inspections of dams throughout the United States.

b. Purpose. The purpose of this inspection is to determine if the dam constitutes a hazard to human life or property.

1.2 Description of Project

a. Dam and Appurtenances. The Rossiter Dam consists of an earth embankment approximately 500 feet long with a maximum height of 14 feet from the downstream toe. The crest width is approximately eight feet. The upstream and downstream slopes are approximately 2 horizontal to 1 vertical. The upstream slope is covered with riprap and the downstream slope is overgrown with large trees and brush.

The spillway consists of a 35-foot-wide, 4-foot-deep concrete overflow section located on the left abutment. The spillway overflow section discharges onto a concrete apron which in turn discharges into the natural stream bed. The low level outlet consists of two 24-inch cast iron pipes located approximately 200 feet from the left abutment serving as reservoir drain and water supply pipes. The water supply pipe is equipped with a 10-inch blowoff pipe which could function as a reservoir drain. Flow through the pipes is controlled by valves located at the valvehouse near the downstream toe of dam. The reservoir drainpipe constitutes the emergency drawdown facility for the dam.

b. Location. Rossiter Dam is located (N40° 53.3', W78° 55.3') on an unnamed tributary of Canoe Creek, southeast of Rossiter in Canoe Township, Indiana County, Pennsylvania. Plate 1 presents the location of dam.

c. Size Classification. Small (based on 14-foot height and 37 acre-feet maximum storage capacity).

d. Hazard Classification. The dam is classified to be in the high hazard category. Approximately 2,000 feet downstream from the dam, the stream flows through the residential areas of the town of Rossiter. Numerous houses located 5 to 10 feet above the stream bed are considered to be within the potential floodplain of the stream in the event of a dam failure. It is estimated that a dam failure would cause loss of more than a few lives and considerable property damage in the town of Rossiter.

e. Ownership. Rossiter Water Company (Address: Mr. Thurman Brickell, Rossiter Water Company, Rossiter, PA 15772).

f. Purpose of Dam. Water supply.

g. Design and Construction History. The dam was designed and constructed by Clearfield Bituminous Coal Corporation with completion in 1919.

h. Normal Operating Procedure. The reservoir is normally maintained at the spillway crest level (Elevation 1401, USGS Datum), leaving four feet of freeboard to the top of the dam. Inflow occurring when the reservoir level is at the spillway crest elevation or above is discharged over the uncontrolled spillway.

1.3 Pertinent Data. Elevations referred to in this and subsequent sections of the report are from the design drawings.

a. Drainage Area	1.8 square miles
b. Discharge at Dam Site (cfs)	
Maximum known flood at dam site	Unknown
Outlet conduit at maximum pool	Not functional
Gated spillway capacity at maximum pool	Not applicable
Ungated spillway capacity at maximum pool	738
Total spillway capacity at maximum pool	738
c. Elevation (USGS Datum) (feet)	
Top of dam	1404.5 (existing low spot) 1405.0 (design)
Maximum design pool	1404.5
Normal pool	1401.0 (assumed)
Upstream invert outlet works	Unknown
Downstream invert outlet works	1387±
Maximum tailwater	Unknown
Toe of dam	1390.5±

d. Reservoir Length (feet)

Normal pool level	700±
Maximum pool level (existing)	800±

e. Storage (acre-feet)

Normal pool level	17 (from state files)
Maximum pool level (existing)	37 (estimated)

f. Reservoir Surface (acres)

Normal pool level	4.6
Maximum pool level (existing)	8.0 (estimated)

g. Dam

Type	Earth embankment with concrete gravity spillway.
Length (including spillway)	500 feet
Height	14 feet
Top width	Varies from 8 feet to 10 feet.
Side slopes	Downstream: 2H:1V; Upstream: 2.0H:1V
Zoning	No
Impervious core	Concrete core
Cutoff	Yes
Grout curtain	No

h. Regulating Outlet

Type	24-inch-diameter cast iron pipe
Length	60± feet
Closure	Downstream valve
Access	Valve house
Regulating facilities	Manually operated valve

i. Spillway

Type	Overflow
Length	35 feet (perpendicular to flow)
Crest elevation	1401 (low flow)
Upstream channel	Lake
Downstream channel	Concrete apron and earth channel.

SECTION 2
DESIGN DATA

2.1 Design

a. Data Available. The available data consist of files provided by the Commonwealth of Pennsylvania, Department of Environmental Resources (PennDER), which contain design drawings, correspondence and inspection reports.

(1) Hydrology and Hydraulics. A report on the review of the original design prepared by the Commonwealth of Pennsylvania indicates that the spillway was designed to pass a discharge of 1,000 cubic feet per second (cfs).

(2) Embankment. The available information consists of design drawings.

(3) Appurtenant Structures. The available information consists of design drawings.

b. Design Features

(1) Embankment. Plate 2 illustrates the plan of the embankment and the reservoir. As shown on Plate 3, the dam consists of a homogeneous earth embankment with a central concrete core wall for the full length of the embankment. Plate 3 also shows the valley profile indicating that the concrete core wall was extended to a depth of approximately five to eight feet below the top of ground. The dam was designed to have 2 horizontal to 1 vertical slopes on both the upstream and downstream faces. The design provided riprap protection on the upstream face extending from the upstream toe of the embankment to the dam crest.

(2) Appurtenant Structures. The appurtenant structures consist of a concrete overflow spillway located at the left abutment and outlet works located near the center of the embankment. Details of the spillway and outlet structures are shown in Plates 2 and 3. The spillway overflow section was designed to be 35 feet wide with concrete sidewalls. The top of the side walls were located four feet above the crest of the overflow section. Below the overflow section, a 20-foot-long concrete apron with an 18-inch-high sill was provided to dissipate the energy of flow over the control section. The spillway apron discharges into the natural stream bed spillway.

The outlet works consist of two 24-inch cast iron pipes located near the center line of the embankment. Flow through these pipes is controlled by valves located in a valvehouse near the downstream toe. As shown in Plate 2, the pipes are supported by a concrete cradle equipped with concrete cutoff collars located beneath the upstream slope. Plate 3 shows the details of the outlet facilities. During this inspection, only the downstream end of the supply line blowoff pipe could be located.

c. Design Data

(1) Hydrology and Hydraulics. As previously noted, the spillway was designed to pass a discharge of 1000 cfs.

(2) Embankment. Other than design drawings, no engineering data are available on the design of the embankment.

(3) Appurtenant Structures. Other than design drawings, no engineering data are available on the appurtenant structures.

2.2 Construction. Available information indicates that the dam was designed and constructed by Clearfield Bituminous Coal Corporation of Clearfield, Pennsylvania, during 1916 through 1919. Available information indicates that during construction the dam was periodically inspected by Commonwealth engineers and foundation conditions were approved for further work. Visual observations indicate that no major postconstruction modifications were undertaken.

2.3 Operation. There are no formal operating records maintained for the dam.

2.4 Other Investigations. The available information indicated no additional investigations other than the periodic inspections conducted by the state. The last state inspection was conducted in 1965.

2.5 Evaluation

a. Availability. The available information was provided by the Commonwealth of Pennsylvania, Department of Environmental Resources.

b. Adequacy

(1) Hydrology and Hydraulics. The available information is limited. Only the watershed area and design discharge capacity of the spillway are reported.

(2) Embankment. In view of the age of the dam (completed in 1919), it is clear that the design approach and construction technique are not likely to have been in conformance with currently accepted engineering practice. Design documents lack such considerations as embankment slope stability and seepage analyses. However, the design incorporated such basic components as a concrete cutoff and core wall and downstream slope protection.

(3) Appurtenant Structures. Review of the design drawings indicates that, as designed, no significant deficiencies existed that should affect the overall performance of these facilities.

SECTION 3
VISUAL INSPECTION

3.1 Findings

a. General. The onsite inspection of Rossiter Dam consisted of:

1. The visual inspection of the embankment, abutments, and embankment toe.

2. The visual examination of the spillway and its components and the downstream end of the outlet pipe.

3. The evaluation of the downstream area hazard potential.

The specific observations are illustrated in Plate 4.

b. Embankment. The general inspection of the embankment consisted of searching for indications of structural distress, such as cracks, subsidence, bulging, wet areas, seeps and boils, and observing the general maintenance conditions, the vegetative cover, erosion areas, and other surficial features.

The crest, downstream slope, and the area in the vicinity of the downstream toe were found to be covered with dense trees and brush, precluding a complete inspection of the dam. To the extent that it can be determined, the embankment is considered to be in fair condition structurally . No significant signs of distress or seepage were noted.

Dense vegetation on the dam precluded a survey of the dam crest. At selected locations, freeboard was measured and found to be approximately at or above the design freeboard of four feet. Reinspection of the dam after the clearing of vegetation is considered to be advisable.

c. Appurtenant Structures. The appurtenant structures were examined for deterioration or other signs of distress and for obstructions that might limit flow capacity. In general, the spillway structures were found to be in poor condition. A segment of the spillway sidewall has collapsed and the remaining segments are only marginally stable. The entire structure has significantly deteriorated.

The only visible portions of the outlet works were the valves in the valvehouse and a small discharge channel which appeared to be the downstream end of the supply line blowoff pipe. The dam tender reported that the operational condition of the 24-inch reservoir drainpipe valve was questionable. The supply line blowoff valve was operated and observed to be functional.

d. Reservoir Area. A map review indicates that the watershed is predominantly woodlands and pasturelands. The reservoir appears to be significantly silted. At the spillway section, silt level is within a few inches of the spillway crest level. A review of the regional geology is included in Appendix F.

e. Downstream Channel. The natural stream channel in the vicinity of the dam was found to be stable. Further description of the downstream conditions is included in Section 1.2 d.

3.2 Evaluation. The dam was found to be overgrown with dense trees and brush, precluding adequate inspection. However, to the extent that can be determined, the embankment was found to be in fair condition structurally. No major signs of distress and seepage were noted. However, reinspection of the dam following clearing is considered to be advisable.

SECTION 4
OPERATIONAL FEATURES

4.1 Procedure. There are no formal operating procedures for the dam. The reservoir is normally maintained at the spillway crest level with excess flow discharged through the uncontrolled spillway.

4.2 Maintenance of the Dam. The embankment is completely overgrown with trees and brush and it is not maintained.

4.3 Maintenance of Operating Facilities. The operating facilities for the dam consist of valves located on the reservoir drain, water supply, and water supply blowoff pipes. The dam tender reported that the operational condition of the reservoir drain valve is questionable. The water supply pipe blowoff valve was operated and observed to be functional. In general, the maintenance of the operating equipment was found to be poor.

4.4 Warning System. No formal warning system exists for the dam.

4.5 Evaluation. The maintenance condition of the embankment and operating facilities are considered to be poor. It is recommended that trees and brush should be removed from the embankment and the dam should be reinspected. It is also recommended that the operational condition of the reservoir drainpipe valve be evaluated and necessary maintenance performed.

SECTION 5
HYDRAULICS AND HYDROLOGY

5.1 Evaluation of Features

a. Design Data. Rossiter Dam drains a watershed area of 1.8 square miles and impounds a reservoir with a surface area of 4.6 acres at its normal pool level. The spillway facilities for the dam consist of a concrete overflow structure located at the left abutment. Based on the available freeboard relative to the low spot of the dam, the capacity of the spillway is estimated to be 740 cfs.

b. Experience Data. As previously stated, Rossiter Dam is classified as a small dam in the high hazard category. According to the recommended criteria for evaluating emergency spillway discharge capacities, such impoundments are required to pass flows in the range of one-half to full PMF. In view of the height of the dam which is near the lower limit in the small size category, one-half of the PMF was selected as the spillway design flood.

The PMF inflow hydrograph for the reservoir was determined utilizing the Dam Safety Version of the HEC-1 computer program developed by the Hydrologic Engineering Center of the U.S. Army Corps of Engineers. The data used for the computer analysis are presented in Appendix D. As determined by the computer analysis, the one-half PMF inflow hydrograph was found to have a peak flow of 1640 cfs. The computer input and a summary of the computer output are also included in Appendix D.

c. Visual Observations. On the date of inspection, no conditions were observed that would indicate that the spillway capacity would be significantly reduced in the event of a flood.

d. Overtopping Potential. Various percentages of the PMF inflow hydrograph were routed through the reservoir and it was found that the dam can pass about 20 percent of the PMF without overtopping the dam. For 50 percent of the PMF, it was found that the low area of the embankment crest would be overtopped for a duration of 6.8 hours with a maximum depth of 1.5 feet.

e. Spillway Adequacy. Since the spillway cannot pass the recommended spillway design flood of one-half PMF without overtopping the dam, the spillway is classified as being inadequate.

A breach analysis was conducted to estimate whether failure resulting from overtopping would significantly increase the potential for loss of life or property damage above that which would exist just before overtopping failure. In the breach analysis, a trapezoidal breach was assumed with a 200-foot bottom width, 2H:1V sideslopes, and a depth of 15 feet. The duration of failure was taken as 0.75 hour. It was assumed that the breaching would be initiated when the low spot on the crest of the dam was overtopped by one foot. It was found that the dam would be overtopped

by one foot during the passage of approximately 40 percent of the PMF. The computer outputs for the breach analysis are included in Appendix D.

Review of the flood stages in the community of Rossiter resulting from failure of Rossiter Dam indicates that while the discharge from the dam before failure (1300 cfs, 40 percent PMF) would be essentially contained within the banks of the stream, the discharge from the dam after failure would increase to about 2800 cfs, overtopping the stream banks by about one foot and covering a large area. The increase in the flood depth is considered to pose a significant increase in the potential for loss of life and downstream damage. Therefore, the flood discharge capacity of Rossiter Dam is considered to be seriously inadequate.

SECTION 6
STRUCTURAL STABILITY

6.1 Evaluation of Structural Stability

a. Visual Observations

(1) Embankment. As discussed in Section 3, although the dam could not be completely inspected because of dense vegetative cover, to the extent that could be determined, no signs of distress were noted that would significantly affect the stability of the dam at this time.

(2) Appurtenant Structures. Portions of the spillway side walls have collapsed and the remaining portions appear to be marginally stable. Other than the valves in the valvehouse, no portions of the outlet facilities were visible to assess their structural conditions.

b. Design and Construction Data

(1) Embankment. The available design and construction information do not provide any quantitative data which could aid in the assessment of the embankment stability. However, as previously noted, field observations did not reveal any signs of distress that would significantly affect the stability of the embankment at this time and none were reported in the past. Therefore, based on visual observations, the static stability of the embankment is considered to be adequate.

(2) Appurtenant Structures. Other than design drawings, no design and/or construction data exists for the appurtenant structures. Review of the drawings indicates that there are no apparent structural deficiencies that would significantly affect the performance of the appurtenant structures.

c. Operating Records. None available.

d. Postconstruction Changes. None reported.

e. Seismic Stability. The dam is located in Seismic Zone 1; and based on visual observations, the static stability of the dam is considered to be adequate. Therefore, based on the recommended criteria for the evaluation of seismic stability of dams, the structure is presumed to present no hazard as a result of earthquakes.

SECTION 7
ASSESSMENT AND RECOMMENDATIONS/PROPOSED REMEDIAL MEASURES

7.1 Dam Assessment

a. Assessment. In view of the seriously inadequate spillway capacity, the condition of Rossiter Dam is considered to be unsafe/nonemergency. The dam was found to be overgrown with dense trees and brush, precluding a complete inspection. However, to the extent that can be determined, the structural condition of the embankment is considered to be fair. No signs of distress and seepage were noted. The spillway structures were found to have partially collapsed.

The flood discharge capacity was evaluated according to the recommended procedure and the spillway was found to pass about 20 percent of the PMF without overtopping the dam. According to the recommended criteria, small dams in the high hazard category are required to pass one-half to full PMF. In view of the small size of the dam, one-half PMF was selected as the spillway design flood. The available spillway capacity is less than the selected design spillway flood of one-half PMF. Results of a breach analysis indicate that the potential loss of life and downstream damage could be significantly increased due to a dam failure. Therefore, the spillway capacity is classified as seriously inadequate.

b. Adequacy of Information. The available information, in conjunction with visual observations, is considered to be sufficient to make a Phase I evaluation.

c. Urgency. The following recommendations should be implemented immediately.

d. Necessity for Additional Investigations. In view of the seriously inadequate spillway capacity, the owner should retain a professional engineer in order to determine the nature and extent of improvements required to provide an adequate spillway capacity.

7.2 Recommendations/Remedial Measures. It is recommended that:

1. The owner should immediately retain a professional engineer to conduct additional hydrologic and hydraulic studies to more accurately ascertain the spillway capacity and the nature and extent of improvements required to provide adequate spillway capacity.

2. In conjunction with the above work, the spillway structure should be repaired.

3. Means should be developed to provide an upstream closure for the pipes through the embankment.

4. Trees and brush on the crest and downstream face of the dam and in an area 50 feet below the downstream toe should be cleared.

5. Around-the-clock surveillance should be provided during unusually heavy runoff and a formal warning system should be developed to alert the downstream residents in the event of an emergency.

6. The owner should develop a formal operating and maintenance plan for the dam, inspect the dam regularly, and perform the necessary maintenance.

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

APPENDIX A

CHECKLIST
VISUAL INSPECTION
PHASE I

NDI: PA-1080

NAME OF DAM Rossiter Dam COUNTY Indiana STATE Pennsylvania ID# DER: 032-019

TYPE OF DAM Earth HAZARD CATEGORY High

DATE(S) INSPECTION July 16, 1981 WEATHER Sunny and warm TEMPERATURE 85

POOL ELEVATION AT TIME OF INSPECTION 1401± M.S.L. TAILWATER AT TIME OF INSPECTION N/A M.S.L.

INSPECTION PERSONNEL:

Wah-Tak Chan, P.E.

Bilgin Erel, P.E.

REVIEW INSPECTION PERSONNEL:
(July 31, 1981)

Lawrence D. Andersen, P.E.

James H. Poellot, P.E.

Wah-Tak Chan, P.E.

Wah-Tak Chan, P.E. RECORDER

Owner's representative:

Mr. Thurman Brickel
(owner)

VISUAL INSPECTION
PHASE I
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SURFACE CRACKS	None Observed.	
UNUSUAL MOVEMENT OR CRACKING AT OR BEYOND THE TOE	None Observed.	
SLOUGHING OR EROSION OF EMBANKMENT AND ABUTMENT SLOPES	None Observed.	
VERTICAL AND HORIZONTAL ALIGNMENT OF THE CREST	See Plate 5 for dam crest profile.	
RIPRAP FAILURES	Generally in fair condition.	

VISUAL INSPECTION
PHASE I
EMBANKMENT

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
JUNCTION OF EMBANKMENT AND ABUTMENT, SPILLWAY AND DAM	No signs of distress noted.	
ANY NOTICEABLE SEEPAGE	None observed.	
STAFF GAGE AND RECORDER	None	
DRAINS	None	

VISUAL INSPECTION
PHASE I
OUTLET WORKS

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CRACKING AND SPALLING OF CONCRETE SURFACES IN OUTLET CONDUIT	Reservoir drain pipe is a 24-inch-diameter cast iron pipe. No portion of the pipe is visible.	
INTAKE STRUCTURE	Submerged not visible.	
OUTLET STRUCTURE	Downstream end of reservoir drain pipe could not be located.	
OUTLET CHANNEL	None	
EMERGENCY GATE	Twenty-four-inch reservoir drainpipe valve is not functional. The reservoir can also be drained through 10-inch supply pipe blowoff valve. This valve was operated and observed to be functional.	The owner should perform recurring maintenance to render the 24-inch reservoir drainpipe functional.

VISUAL INSPECTION
PHASE I
UNGATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE WEIR	Concrete severely deteriorated.	The remains of flashboard attachment should be removed, concrete should be repaired.
APPROACH CHANNEL	Lake. No significant obstructions to flow.	
DISCHARGE CHANNEL	Side walls of the discharge channel have collapsed. Structure is in poor condition.	
BRIDGE AND PIERS	None	

VISUAL INSPECTION
PHASE I
GATED SPILLWAY

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONCRETE SILL	The dam has no gated spillway.	
APPROACH CHANNEL	N/A	
DISCHARGE CHANNEL	N/A	
BRIDGE PIERS	N/A	
GATES AND OPERATION EQUIPMENT	N/A	

VISUAL INSPECTION
PHASE I
INSTRUMENTATION

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
MONUMENTATION/SURVEYS	The dam has no instrumentation.	
OBSERVATION WELLS	None	
WEIRS	None	
PIEZOMETERS	None	
OTHER	None	

VISUAL INSPECTION
PHASE I
RESERVOIR

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
SLOPES	No problems observed.	
SEDIMENTATION	Unknown	
UPSTREAM RESERVOIRS	None	

VISUAL INSPECTION
PHASE I
DOWNSTREAM CHANNEL

VISUAL EXAMINATION OF	OBSERVATIONS	REMARKS OR RECOMMENDATIONS
CONDITION (OBSTRUCTIONS, DEBRIS, ETC.)	Trees, dense brush and debris in downstream earth channel.	
SLOPES	Moderate to mild slope, no problems observed.	
APPROXIMATE NUMBER OF HOMES AND POPULATION	Village of Rossiter is located one-third mile downstream from dam, population more than 50 (town population = 800±). Numerous houses are within five to ten feet of the stream bed.	

APPENDIX B

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
AND HYDROLOGIC AND HYDRAULIC
PHASE I

APPENDIX B

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

NAME OF DAM Rossiter Dam

ID# NDI: PA-1030
DER: 032-019

ITEM	REMARKS
AS-BUILT DRAWINGS	Some design drawings are available in state files.
REGIONAL VICINITY MAP	See Plate 1.
CONSTRUCTION HISTORY	Designed and constructed by Clearfield Bituminous Coal Corporation. Construction started in September 1917, and was completed in June 1919.
TYPICAL SECTIONS OF DAM	See Plate 3.
OUTLETS - PLAN - DETAILS - CONSTRAINTS - DISCHARGE RATINGS	See Plates 2 and 3.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
RAINFALL/RESERVOIR RECORDS	None reported.
DESIGN REPORTS	A state report, "Report Upon the Application of the Clearfield Bituminous Coal Corporation," dated August 17, 1916, summarizes design features of the dam.
GEOLOGY REPORTS	No formal report is available. Some subsurface information is included in Plate 3.
DESIGN COMPUTATIONS HYDROLOGY & HYDRAULICS DAM STABILITY SEEPAGE STUDIES	Spillway design capacity calculations are available in state files.
MATERIALS INVESTIGATIONS BORING RECORDS LABORATORY FIELD	The results of five auger drillholes were reported in, "Report Upon the Application of the Clearfield Bituminous Coal Corporation," dated August 17, 1916.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, ON
PHASE I

ITEM	REMARKS
POST CONSTRUCTION SURVEYS OF DAM	None available.
BORROW SOURCES	The embankment material was borrowed from the reservoir area.
MONITORING SYSTEMS	None
MODIFICATIONS	None reported.
HIGH POOL RECORDS	None available.

CHECKLIST
ENGINEERING DATA
DESIGN, CONSTRUCTION, OPERATION
PHASE I

ITEM	REMARKS
POST CONSTRUCTION ENGINEERING STUDIES AND REPORTS	None available.
PRIOR ACCIDENTS OR FAILURE OF DAM DESCRIPTION REPORTS	None reported.
MAINTENANCE OPERATION RECOkDS	None recorded.
SPILLWAY PLAN SECTIONS DETAILS	See Plate 2.
OPERATING EQUIPMENT PLANS AND DETAILS	See Plates 2 and 3.

CHECKLIST
ENGINEERING DATA
HYDROLOGIC AND HYDRAULIC

DRAINAGE AREA CHARACTERISTICS: 1.8 sq. miles (partially woodland and farmland)

ELEVATION, TOP OF NORMAL POOL AND STORAGE CAPACITY: 1401 (17 acre-feet)

ELEVATION, TOP OF FLOOD CONTROL POOL AND STORAGE CAPACITY: 1404.5 (37 acre-feet)

ELEVATION, MAXIMUM DESIGN POOL: 1404.5

ELEVATION, TOP OF DAM: 1404.5 (measured low spot)

SPILLWAY:

a. Elevation 1401

b. Type Concrete overflow

c. Width 35 feet (perpendicular to flow)

d. Length N/A

e. Location Spillover Left abutment

f. Number and Type of Gates None

OUTLET WORKS:

a. Type 24-inch-diameter blowoff (not operable)

b. Location Near center of embankment

c. Entrance Inverts Unknown

d. Exit Inverts Downstream end could not be located.

e. Emergency Drawdown Facilities Presently, 10-inch supply line blowoff pipe valve is functional.

HYDROMETEOROLOGICAL GAGES:

a. Type N/A

b. Location N/A

c. Records N/A

MAXIMUM NONDAMAGING DISCHARGE: 740 cfs (spillway capacity)

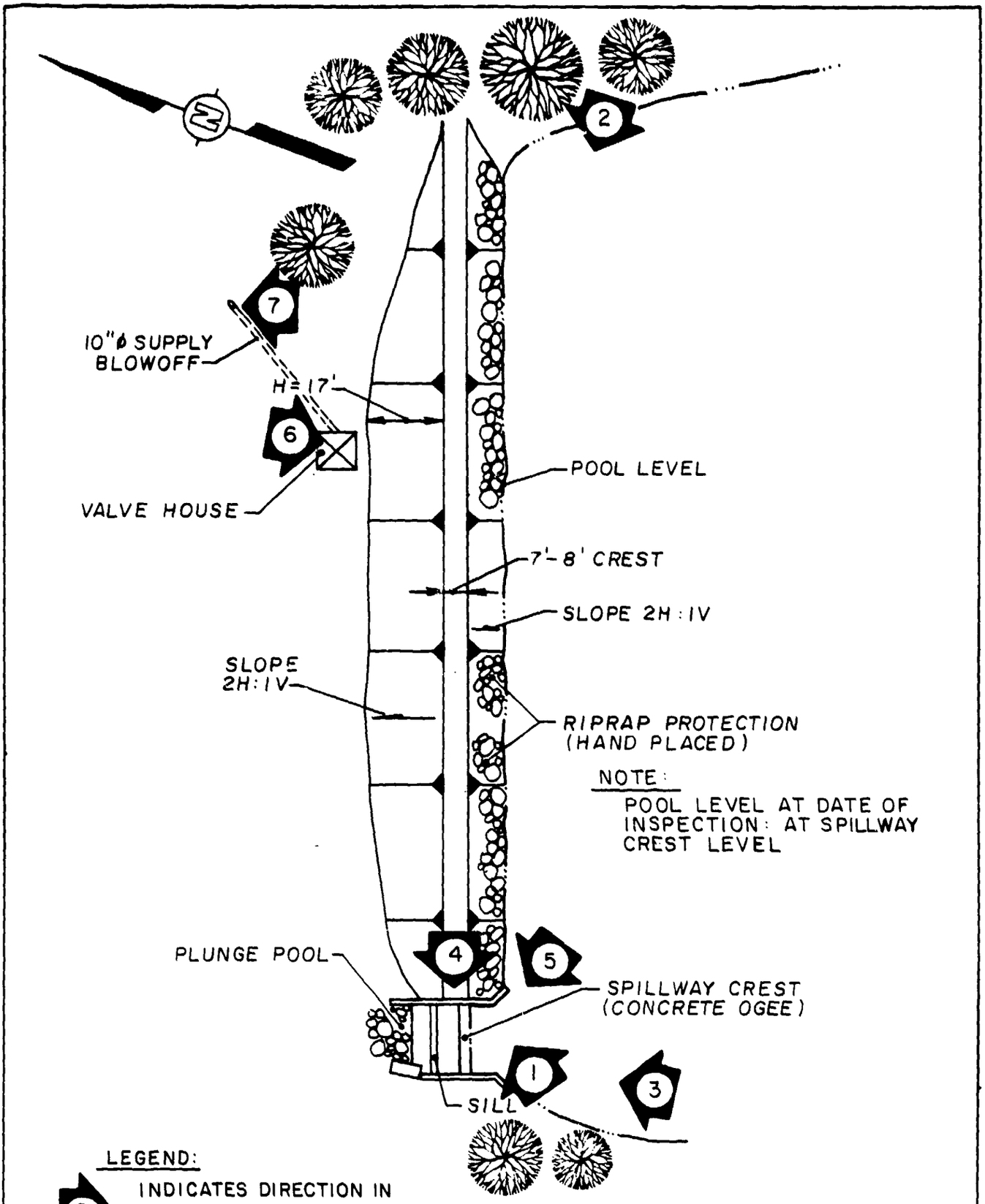
Note: Elevation Datum, per design drawings.

APPENDIX C

PHOTOGRAPHS

LIST OF PHOTOGRAPHS
ROSSITER DAM
NDI I.D. NO. PA-1080
July 16, 1981

PHOTOGRAPH NO.	DESCRIPTION
1	Dam crest (looking north).
2	Trees and dense brush growth on dam crest and slopes.
3	Spillway and approach channel, (looking west).
4	Spillway crest and sidewalls (looking south). Note the deteriorated condition of the concrete.
5	Spillway plunge pool and discharge channel overgrown with trees and dense brush.
6	10-inch supply line blowoff valve.
7	10-inch supply line blowoff in section.
8	Village of Rossiter located one-third mile downstream from the dam. Note creek alignment to the left of the power poles.



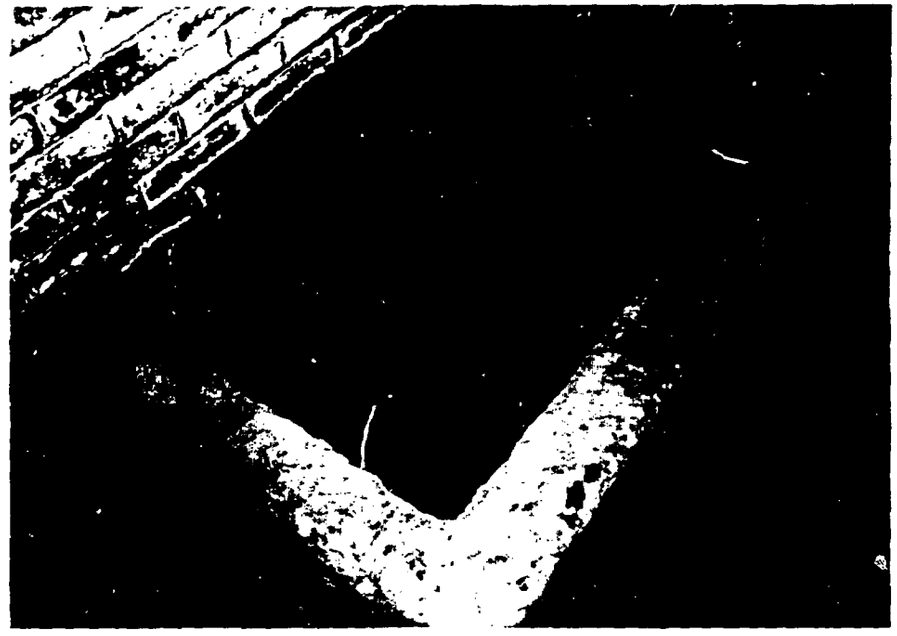
PHOTOGRAPH NO. 1

PHOTOGRAPH NO. 2

PHOTOGRAPH NO. 3

PHOTOGRAPH NO. 4

PHOTOGRAPH NO. 5



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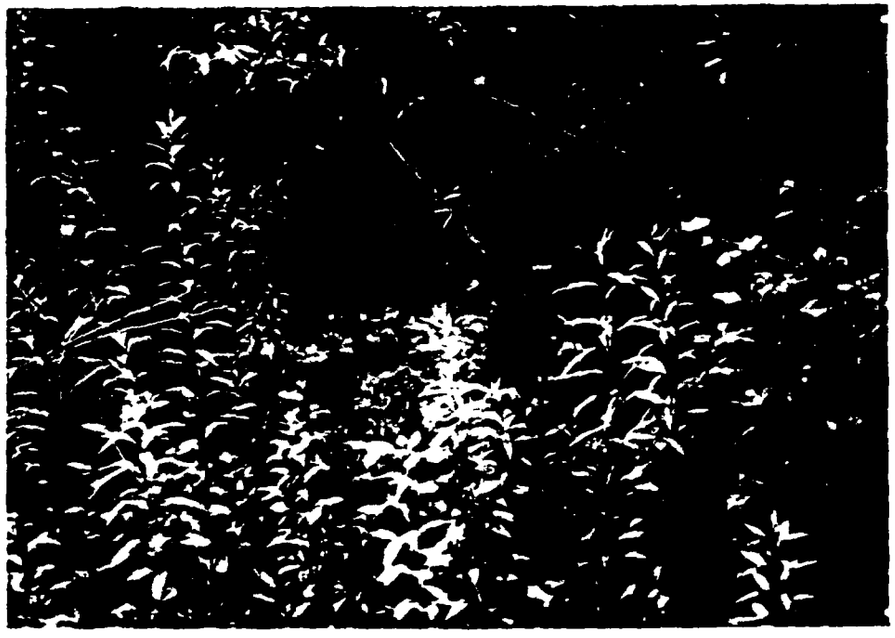


PHOTOGRAPH NO.7

PHOTOGRAPH NO. 8

APPENDIX D

HYDROLOGIC/HYDRAULIC ANALYSIS

HYDROLOGY AND HYDRAULIC ANALYSIS
DATA BASE

NAME OF DAM: Rossiter Dam

PROBABLE MAXIMUM PRECIPITATION (PMP) = 23.5 INCHES/24 HOURS

STATION	1	2	3	4	5
Station Description	Rossiter Dam Reservoir	Rossiter Dam			
Drainage Area (square miles)	1.77	-			
Cumulative Drainage Area (square miles)	1.77	1.77			
Adjustment of PMP for Drainage Area (%)(1)					
6 Hours	102	-			
12 Hours	120	-			
24 Hours	130	-			
48 Hours	140	-			
72 Hours	-	-			
Snyder Hydrograph Parameters					
Zone(2)	24	-			
C_p/C_t(3)	0.45/1.6	-			
L (miles)(4)	2.56	-			
L_{ca} (miles)(4)	1.17	-			
$t_p = C_t(L \cdot L_{ca})^{0.3}$ (hours)	2.23	-			
Spillway Data					
Crest Length (ft)	-	35.0			
Freeboard (ft)	-	3.5			
Discharge Coefficient	-	3.2			
Exponent	-	1.5			

(1) Hydrometeorological Report 33, U.S. Weather Bureau and U.S. Army Corps of Engineers, 1956.
(2) Hydrological zone defined by Corps of Engineers, Baltimore District, for determining Snyder's Coefficients (C_p and C_t).
(3) Snyder's Coefficients.
(4) L = Length of longest water course from outlet to basin divide.
L_{ca} = Length of water course from outlet to point opposite the centroid of drainage area.

STORAGE VS. ELEVATION

ELEVATION	ΔH, FEET	AREA (acres)(1)	ΔVOLUME (acre-feet)(2)	STORAGE (acre-feet)
1420		23.0		256.8
	19		239.9	
1401 (Normal pool elevation)		4.6		16.9
	11		16.9(3)	
1390 Reservoir Bottom		0.0		0

(1) Planimetered from USGS maps.
(2) ΔVolume = $\Delta H/3\ (A_1 + A_2 + \sqrt{A_1 A_2})$.
(3) From PennDER files.

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  01 APR 80
**********
    1                A1       SNYDER UNIT HYDROGRAPH, SPILLWAY AND DAM OVERTOPING ANALYSES
    2                A2       ROSSITER DAM,(DER 32-19),INDIANA COUNTY,PA.          PROJECT NO.80-556-22
    3                A3       FOR 20%,30%,40%,50%,AND 100% PROBABLE MAXIMUM FLOOD(PMF)
    4                B     300        0       15        0        0        0        0        0       -4        0
    5                B1      5
    6                J       2        5        1
    7                J1   0.20     0.30     0.40     0.50     1.00
    8                K       0        1                                      1
    9                K1       CALCULATION OF SNYDER INFLOW HYDROGRAPH TO ROSSITER DAM,(DER 32-19)
   10                M       1        1     1.77             1.77                                    1
   11                P              23.5      102      120      130      140
   12                T                                                      1.0     0.05            0.0041
   13                W    2.23     0.45
   14                X    -1.5    -0.05      2.0
   15                K       1        2                                      1
   16                K1       ROUTING FLOW THROUGH ROSSITER DAM,(DER 32-19)
   17                Y                                1        1
   18                Y1      1                                       -1401.0
   19                $A    0.0      4.6     23.0
   20                $E1390.0   1401.0   1420.0
   21                $S1401.0     35.0     3.22      1.5
   22                $D1404.5     2.65      1.5    500.0
   23                $L   10.0    110.0    210.0    500.0
   24                $V1404.5   1405.5   1405.9   1406.0
   25                $B 200.0      2.0   1390.0     0.75   1401.0   1420.0
   26                $B 200.0      2.0   1390.0     0.75   1401.0   1405.5
   27                K       1        3                                      1
   28                K1       CHANNEL ROUTING USING MODIFIED PULS: REACH 1 (STATION 0+00 TO 4+00)
   29                Y                                1        1
   30                Y1      1
   31                Y6 0.045    0.045    0.045   1380.0   1389.5    400.0   0.0200
   32                Y7    0.0   1440.0    150.0   1420.0    400.0   1400.0    650.0   1380.0    660.0   1380.0
   33                Y71000.0   1400.0   1250.0   1420.0   1400.0   1440.0
   34                K       1        4                                      1
   35                K1       CHANNEL ROUTING USING MODIFIED PULS: REACH 2 (STATION 4+00 TO 16+00)
   36                Y                                1        1
   37                Y1      1
   38                Y6 0.045    0.040    0.045   1360.0   1369.5   1200.0   0.0167
   39                Y7    0.0   1420.0    150.0   1400.0    320.0   1380.0    590.0   1360.0    600.0   1360.0
   40                Y7 700.0   1340.0    950.0   1400.0   1050.0   1420.0
   41                K       1        5                                      1
   42                K1       CHANNEL ROUTING USING MODIFIED PULS: REACH 3 (STATION 16+00 TO 32+00)
   43                Y                                1        1
   44                Y1      1
   45                Y6 0.045    0.040    0.045   1340.0   1349.5   1600.0   0.0125
   46                Y7    0.0   1400.0    100.0   1380.0    350.0   1360.0    440.0   1340.0    450.0   1340.0
   47                Y7 790.0   1360.0    900.0   1380.0    980.0   1400.0
   48                K      99
```

COMPUTER INPUT DAM OVERTOPPING
AND BREACH ANALYSIS

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .20	RATIO 2 .30	RATIO 3 .40	RATIO 4 .50	RATIO 5 1.00
HYDROGRAPH AT	1	1.77	1	656.	984.	1312.	1640.	3281.
	(	4.58)	(	18.58)(	27.87)(	37.16)(	46.45)(	92.90)(
			2	656.	984.	1312.	1640.	3281.
			(	18.58)(	27.87)(	37.16)(	46.45)(	92.90)(
ROUTED TO	2	1.77	1	649.	978.	1309.	1640.	3282.
	(	4.58)	(	18.39)(	27.71)(	37.07)(	46.43)(	92.95)(
			2	649.	978.	2627.	2854.	3315.
			(	18.39)(	27.71)(	74.39)(	80.82)(	93.87)(
ROUTED TO	3	1.77	1	649.	979.	1308.	1639.	3283.
	(	4.58)	(	18.39)(	27.71)(	37.05)(	46.42)(	92.96)(
			2	649.	979.	2516.	2743.	3277.
			(	18.39)(	27.71)(	71.26)(	77.66)(	92.78)(
ROUTED TO	4	1.77	1	649.	979.	1307.	1638.	3282.
	(	4.58)	(	18.38)(	27.73)(	37.02)(	46.39)(	92.94)(
			2	649.	979.	2465.	2779.	3283.
			(	18.38)(	27.73)(	69.81)(	78.70)(	92.97)(
ROUTED TO	5	1.77	1	648.	980.	1309.	1636.	3280.
	(	4.58)	(	18.35)(	27.74)(	37.07)(	46.33)(	92.87)(
			2	648.	980.	2555.	2856.	3281.
			(	18.35)(	27.74)(	72.35)(	80.88)(	92.90)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1401.00	1401.00	1404.50
STORAGE	17.	17.	37.
OUTFLOW	0.	0.	738.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1404.21	0.00	35.	649.	0.00	42.25	0.00
.30	1405.09	.59	41.	978.	3.50	42.25	0.00
.40	1405.62	1.12	45.	1309.	5.00	42.00	0.00
.50	1405.96	1.46	48.	1640.	6.75	42.00	0.00
1.00	1406.73	2.23	54.	3282.	11.25	42.00	0.00

PLAN 2 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1401.00	1401.00	1404.50
STORAGE	17.	17.	37.
OUTFLOW	0.	0.	738.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.20	1404.21	0.00	35.	649.	0.00	42.25	0.00
.30	1405.09	.59	41.	978.	3.50	42.25	0.00
.40	1405.53	1.03	44.	2796.	1.46	41.82	41.50
.50	1405.67	1.17	46.	3058.	1.72	41.34	41.00
1.00	1405.62	1.12	45.	3315.	1.72	42.00	39.25

DAM OVERTOPPING (PLAN 1)
AND DAM BREACH (PLAN 2) ANALYSIS SUMMARY

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	649.	1382.4	42.25
.30	979.	1382.9	42.25
.40	1308.	1383.3	42.00
.50	1639.	1383.6	42.00
1.00	3283.	1384.7	42.00

PLAN 2 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	649.	1382.4	42.25
.30	979.	1382.9	42.25
.40	2516.	1384.2	41.75
.50	2743.	1384.4	41.25
1.00	3277.	1384.7	42.00

DOWNSTREAM FLOOD ROUTING SUMMARY

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	649.	1362.8	42.25
.30	979.	1363.3	42.25
.40	1307.	1363.7	42.25
.50	1638.	1364.1	42.00
1.00	3282.	1365.5	42.00

PLAN 2 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	649.	1362.8	42.25
.30	979.	1363.3	42.25
.40	2465.	1364.9	42.00
.50	2779.	1365.1	41.50
1.00	3283.	1365.5	42.00

PLAN 1 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	648.	1342.8	42.25
.30	980.	1343.3	42.25
.40	1309.	1343.8	42.25
.50	1636.	1344.1	42.25
1.00	3280.	1345.5	42.00

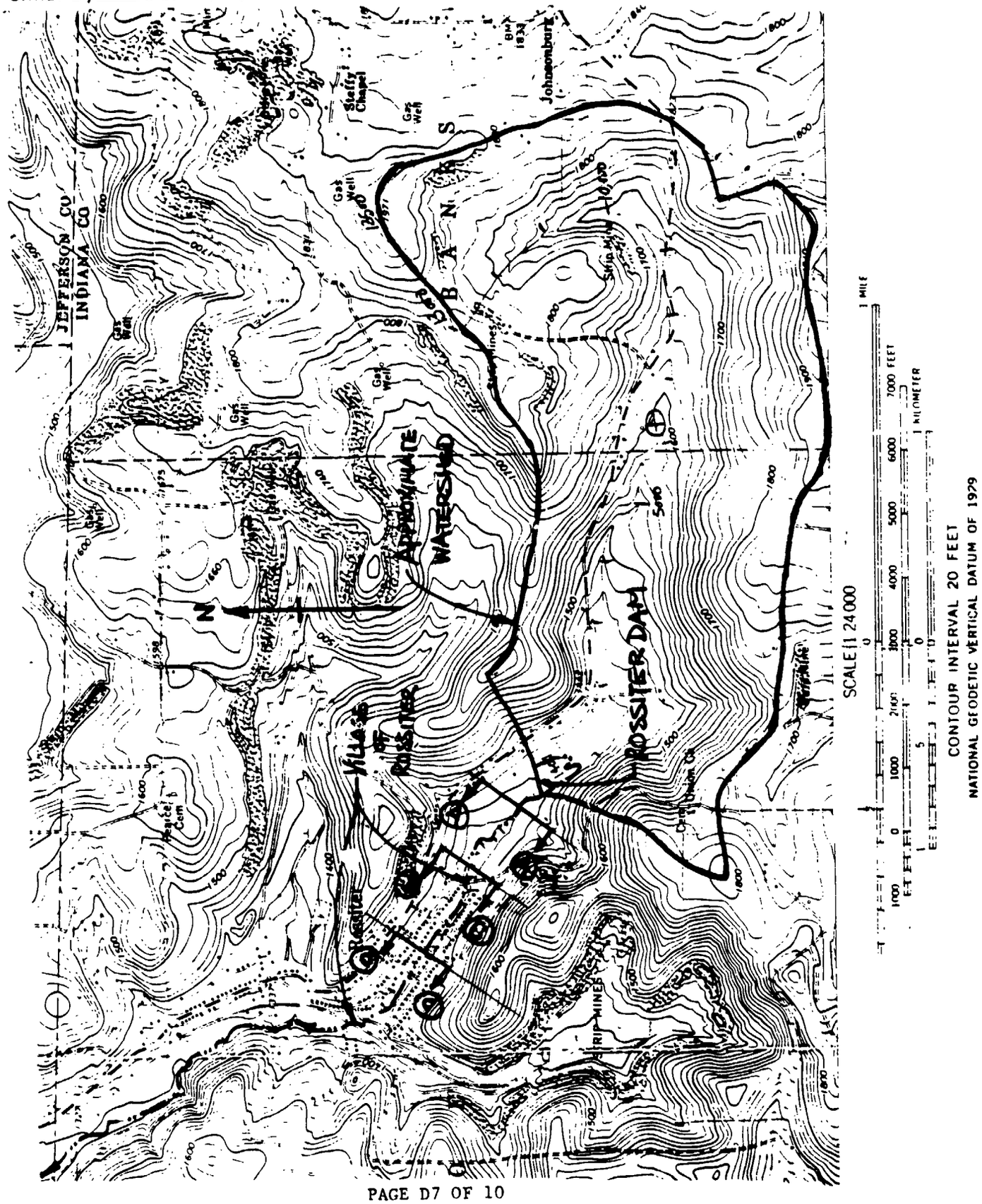
PLAN 2 STATION 5

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
.20	648.	1342.8	42.25
.30	980.	1343.3	42.25
.40	2555.	1345.0	42.00
.50	2856.	1345.2	41.50
1.00	3281.	1345.5	42.00

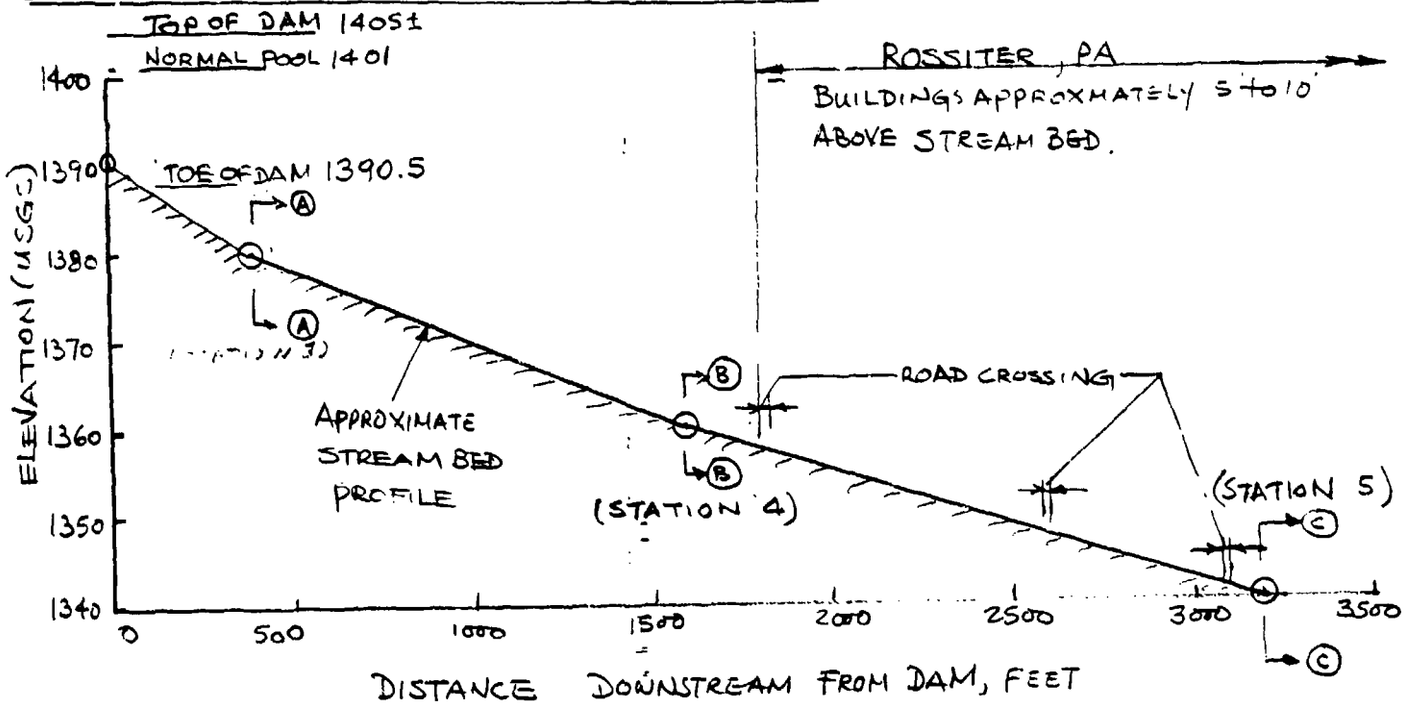
DOWNSTREAM FLOOD ROUTING SUMMARY
(Continued)

D'APPOLONIA
CONSULTING ENGINEERS, INC

By WTC Date 7/27/81 Subject ROSSITER DAM Sheet No. 1 of 3
Chkd. By MB Date 8/4/81 DOWNSTREAM CHANNEL PLAN Proj. No. 80-556



ROSSITER DAM DOWNSTREAM CHANNEL



SECTION Ⓐ-Ⓐ (STATION 3).

DISTANCE FROM LEFT TO RIGHT	ELEVATION (USGS)
0	1440
150	1420
400	1400
650	1380
660	1380
1000	1400
1250	1420
1400	1440

REACH LENGTH = 400'

SLOPE = $\frac{1395-1380}{400}$ = 0.026

D'APPOLONIA
CONSULTING ENGINEERS, INC.

By WTC Date 7/27/81 Subject ROSSITER DAM Sheet No. 3 of 3
Chkd. By MC Date 8/4/81 DOWNSTREAM CHANNEL SECTION Proj. No. 80-356

SECTION (B)-(B) (STATION 4)

DISTANCE		ELEVATION
0		1420
150		1400
320		1380
590	ASSUMED 10' CREEK	1360
600		1360
700		1380
950		1400
1050		1420

REACH LENGTH = 1200 FEET

$$\text{CHANNEL SLOPE} = \frac{1380 - 1360}{1200} = 0.01667$$

SECTION (C)-(C) (STATION 5)

DISTANCE		ELEVATION
0		1400
100		1380
350		1360
440	ASSUMED 10' CREEK	1340
450		1340
790		1360
900		1380
980		1400

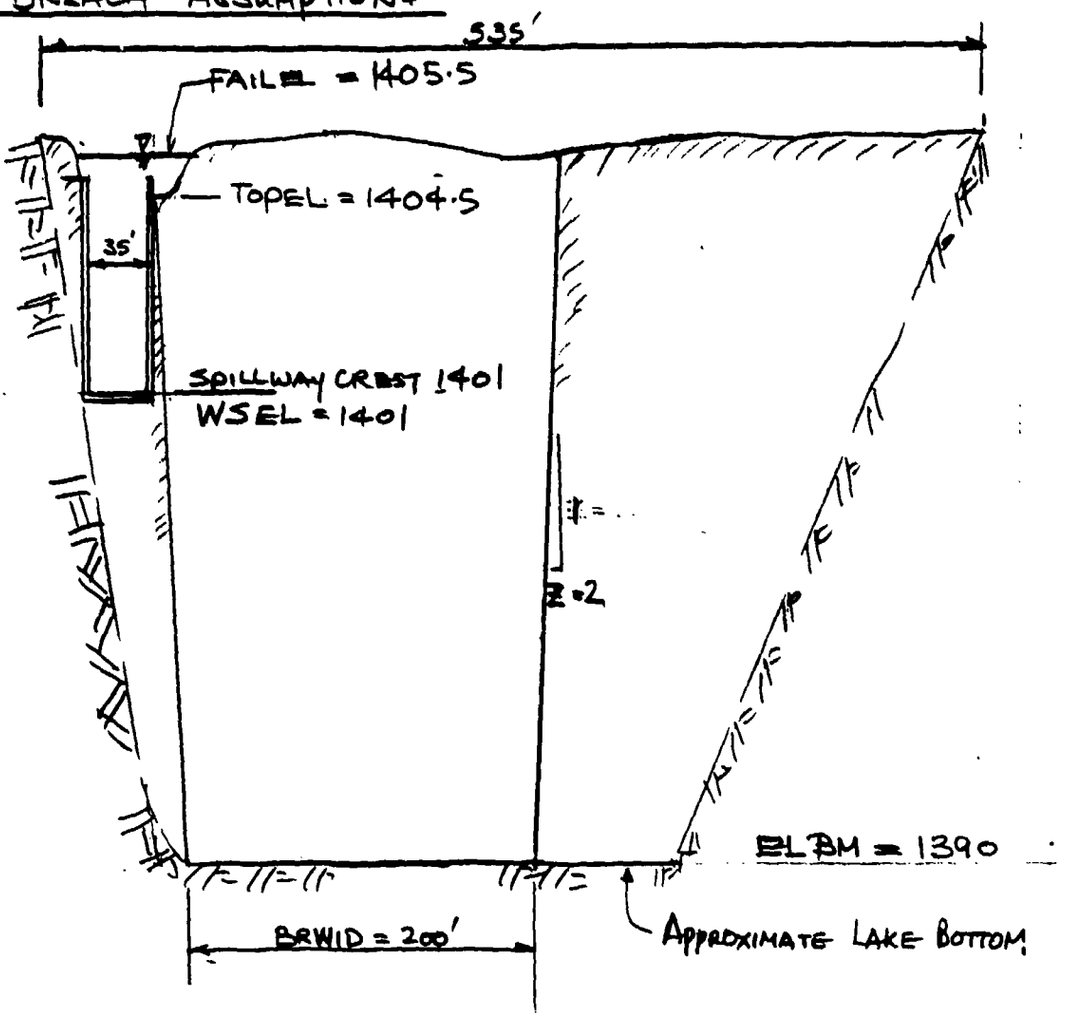
REACH LENGTH = 1600 FEET

$$\text{CHANNEL SLOPE} = \frac{1360 - 1340}{1600} = 0.0125$$

D'APPOLONIA
CONSULTING ENGINEERS, INC.

By WTC Date 7/27/81 Subject ROSSITER DAM Sheet No. 1 of 1
Chkd. By RE Date 8/4/81 DAM BREACH ASSUMPTIONS Proj. No. 80-556

DAM BREACH ASSUMPTIONS

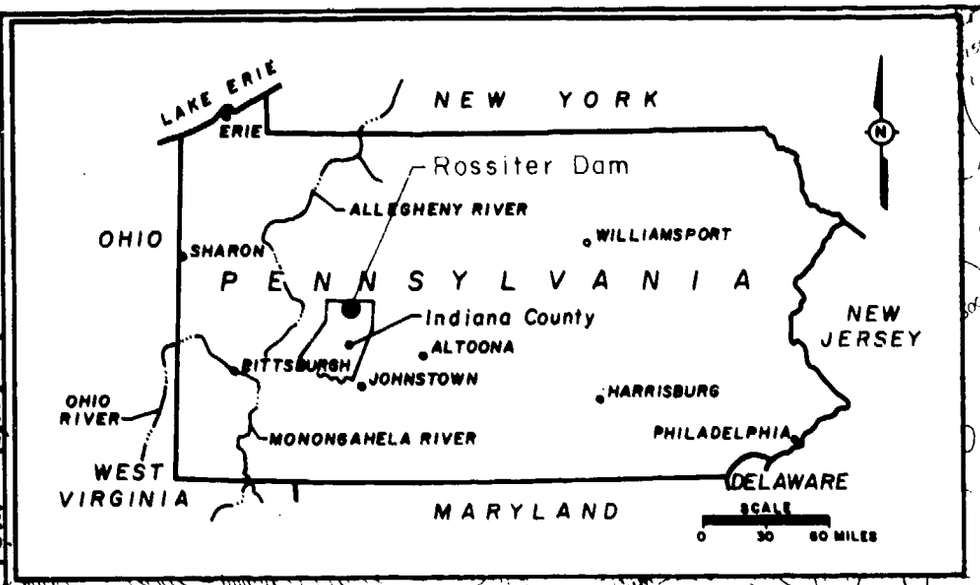


TFAIL = 45 MIN

APPENDIX E

PLATES

DRAWN BY	CHECKED BY		DRAWING NUMBER 80-556-B43
A Smith			
8-6-81	APPROVED BY		



KEY PLAN

REFERENCES:

U.S.G.S. 7.5' PUNXSUTAWNEY, PA. QUADRANGLE
PHOTOREVISED 1972, SCALE: 1" = 2000'

U.S.G.S. 7.5' ROCHESTER MILLS, PA. QUADRANGLE
PHOTOREVISED 1973, SCALE: 1" = 2000'

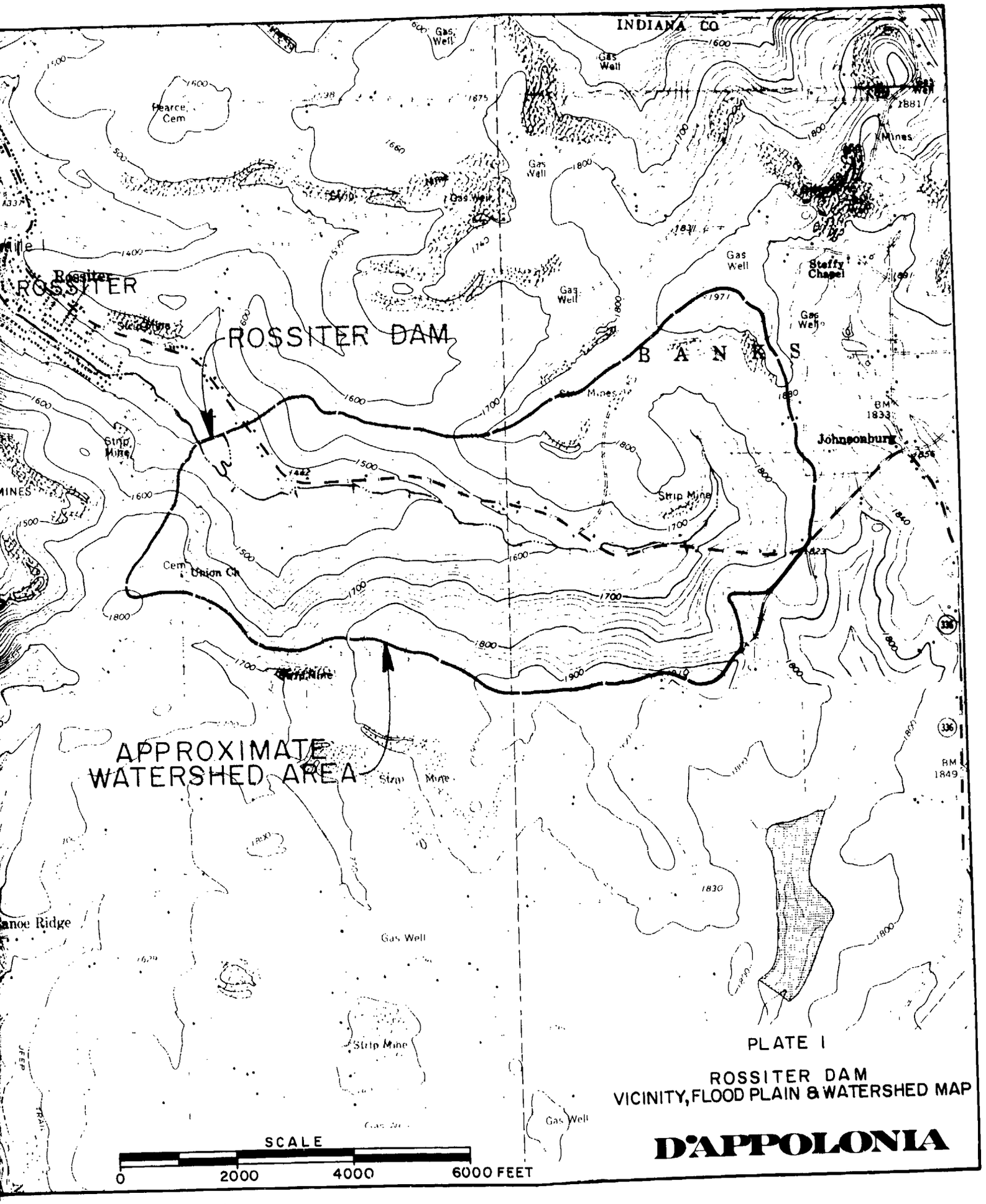
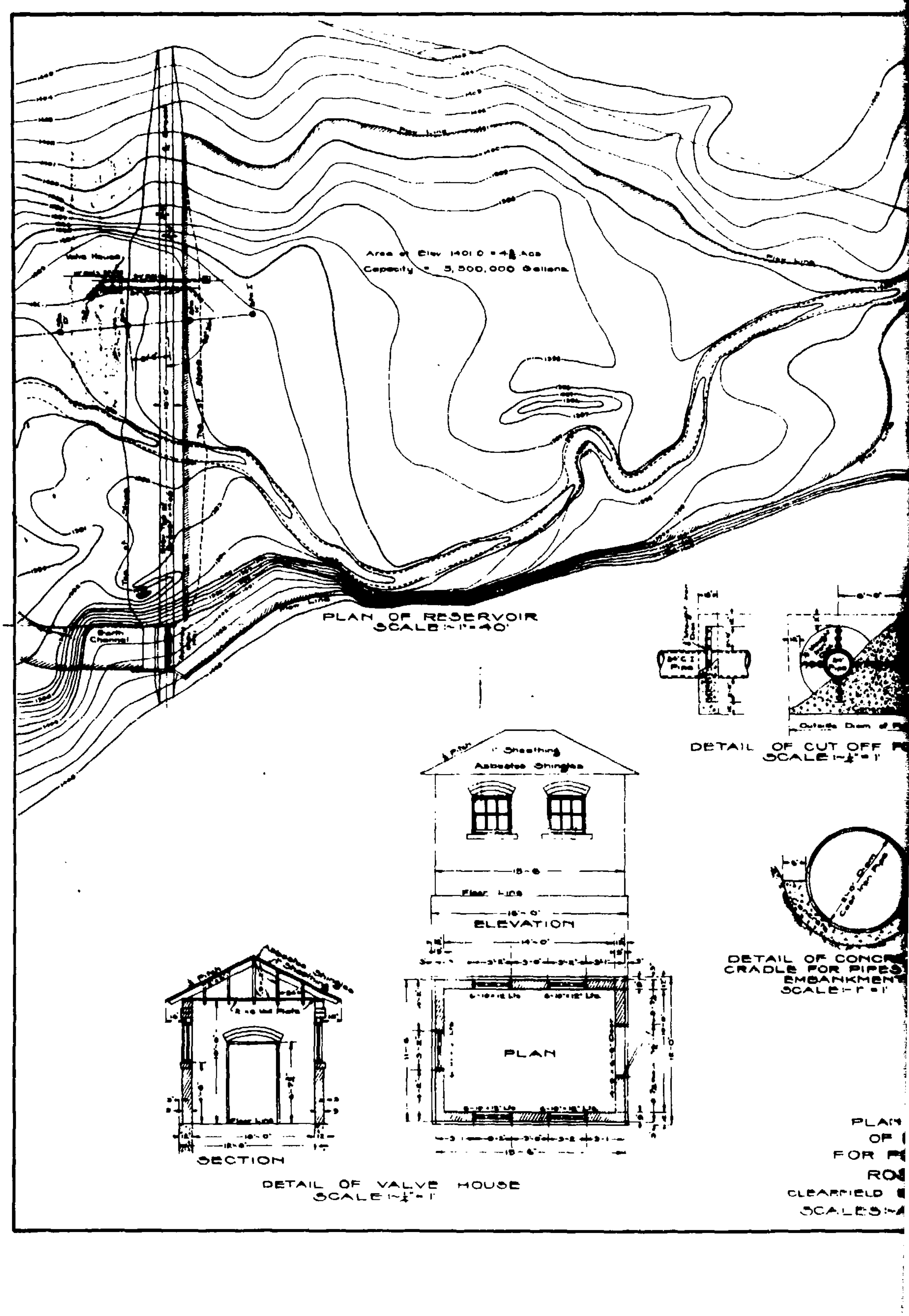


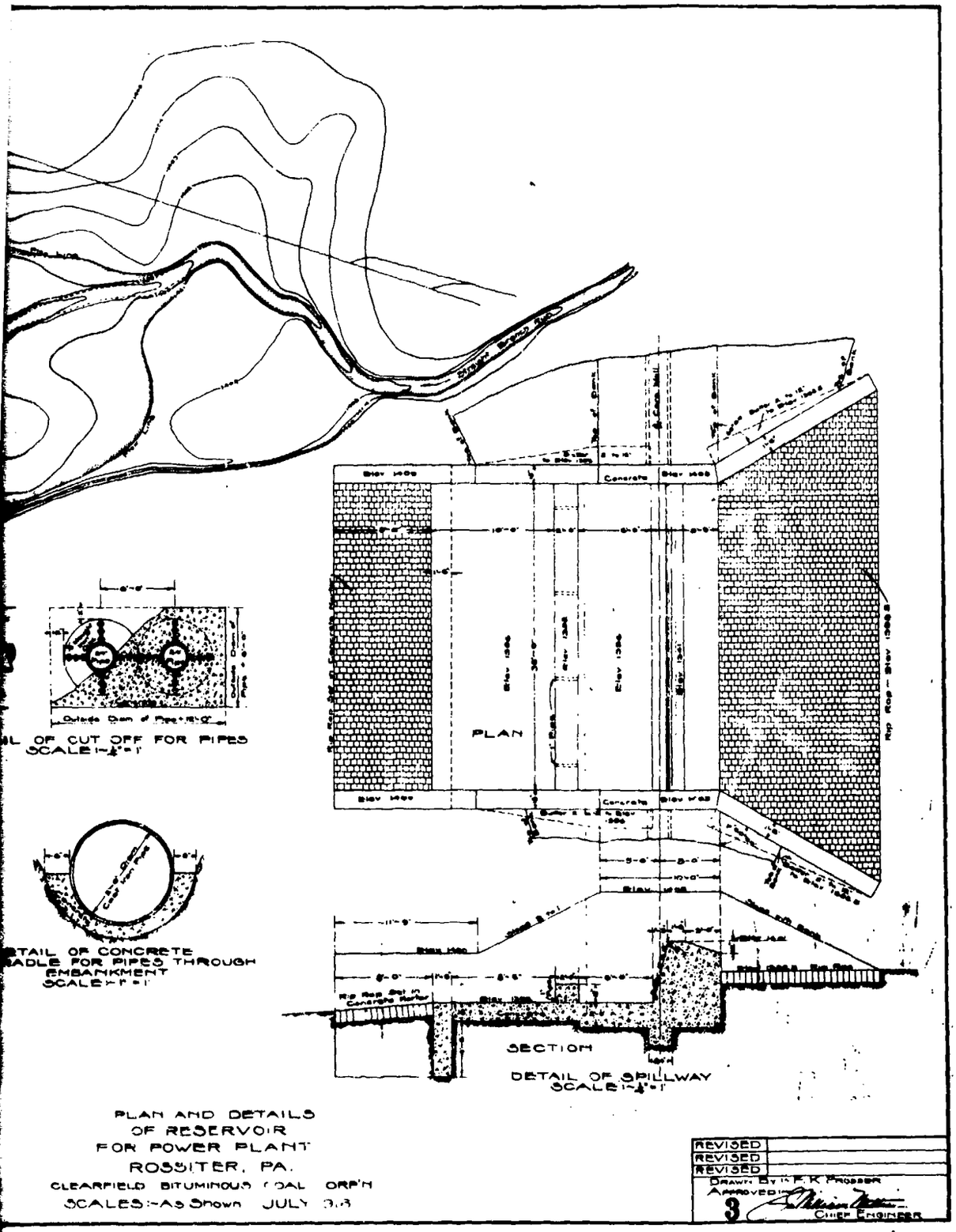
PLATE I

ROSSITER DAM
VICINITY, FLOOD PLAIN & WATERSHED MAP

D'APPOLONIA

DRAWN BY	ACS	8-6-81	CHECKED BY		8-10-81	DRAWING NUMBER 80-556-B44
			APPROVED BY		9/10/81	





PLAN AND DETAILS
OF RESERVOIR
FOR POWER PLANT
ROSSITER, PA.
CLEARFIELD BITUMINOUS COAL CORP'N
SCALES:-As Shown JULY 3.8

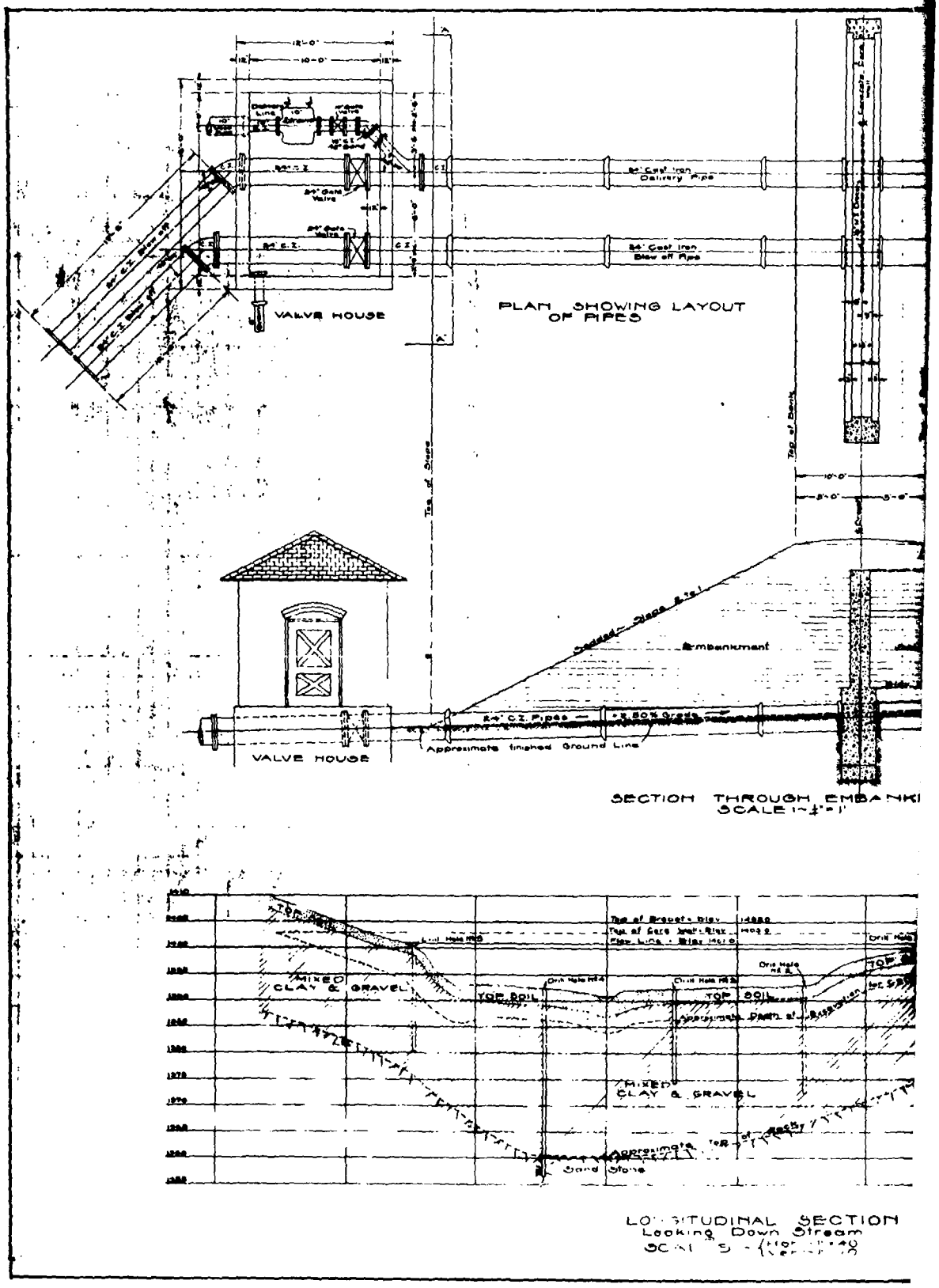
REVISED
REVISED
REVISED
Drawn By F. K. Prosser
Approved 3 Chief Engineer

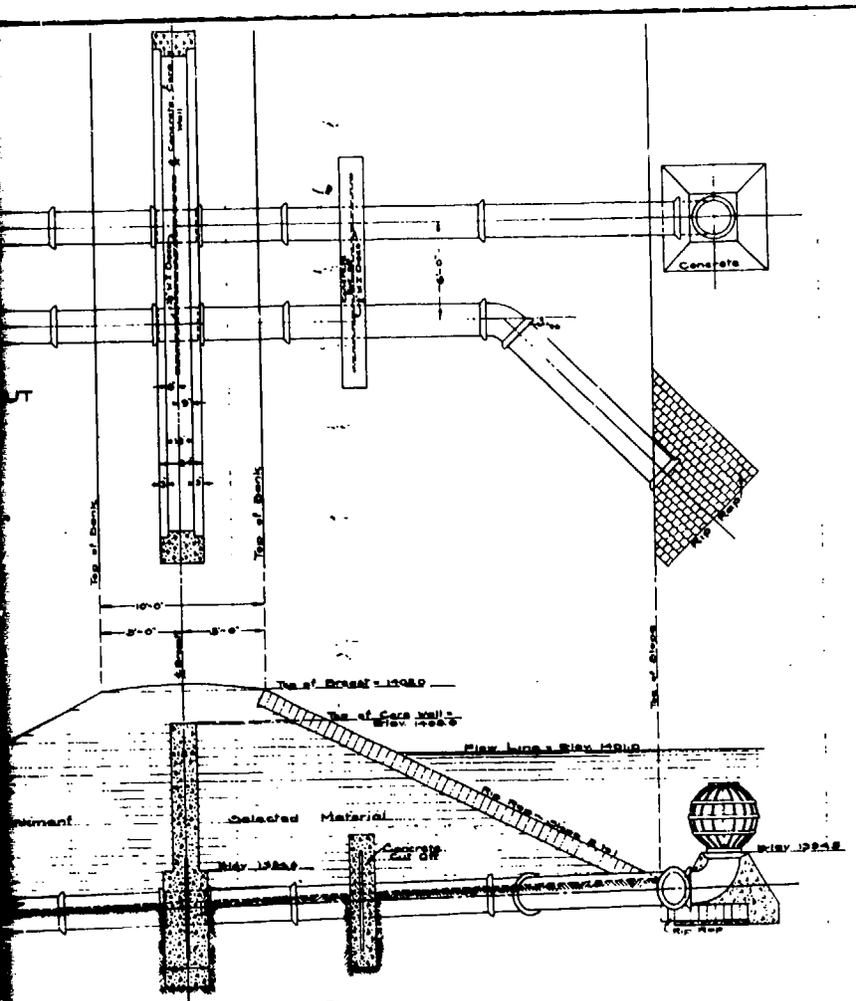
PLATE 2

D'APPOLONIA

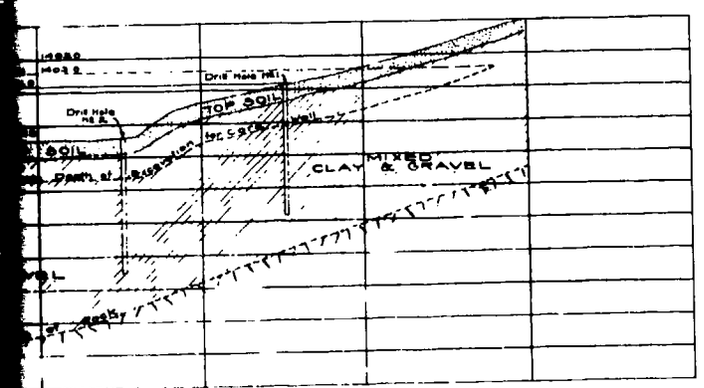
12

DRAWN BY	ACS	CHECKED BY	MC	8-10-81	DRAWING NUMBER 80-556-845
	8.C.H.	APPROVED BY	JMD	8/14/81	





THROUGH EMBANKMENT
SCALE 1"=1'



INAL SECTION
Down Stream
(Horiz. 1"=40'
Vert. 1"=10'

PLAN AND SECTIONS OF
RESERVOIR EMBANKMENT
FOR POWER PLANT
ROSSITER, PA.
CLEARFIELD BITUMINOUS COAL CORP'N
SCALES 1"=As Shown JULY 1914

REVISED	
REVISED	
REVISED	

DRAWN BY: F. K. PROBBER
APPROVED:
2

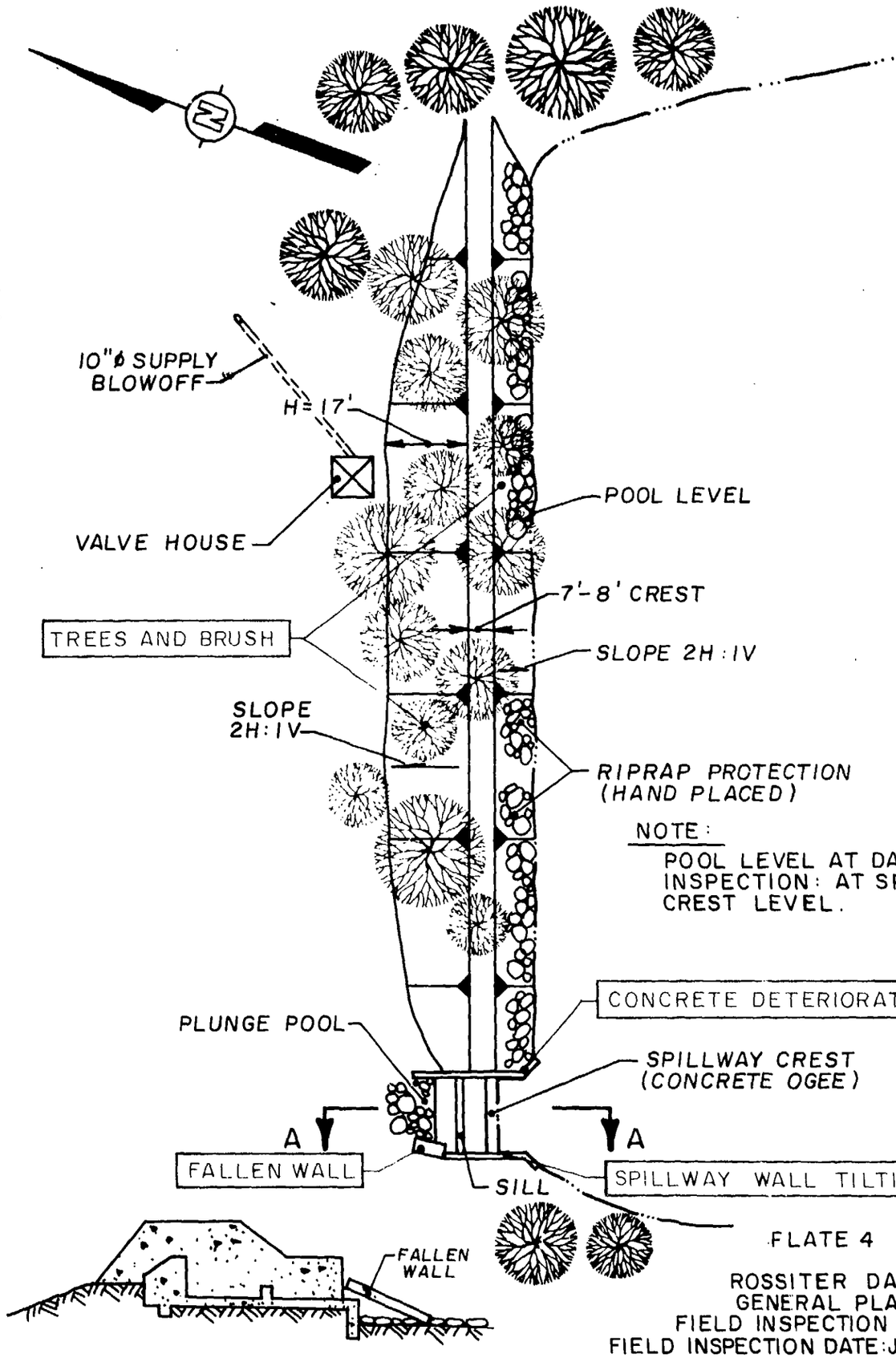
PLATE 3

D'APPOLONIA

2

DRAWN BY	ACS	CHECKED BY		8-6-81
	8-6-81	APPROVED BY		8/10/81

DRAWING NUMBER 80-556-A37



SECTION A-A

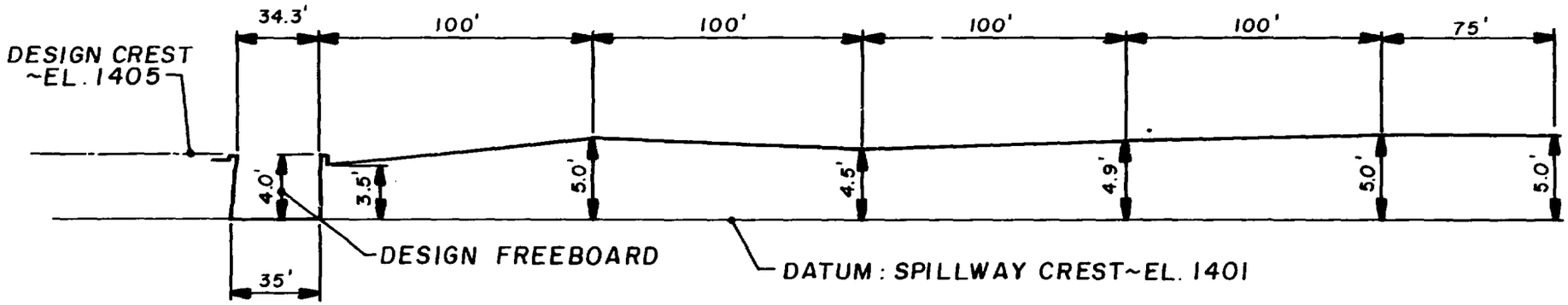
"NOT TO SCALE"

PLATE 4

ROSSITER DAM
GENERAL PLAN
FIELD INSPECTION NOTES
FIELD INSPECTION DATE: JULY 16, 1981

D'APPOLONIA

DRAWN BY	ACS 8-7-81	CHECKED BY	RG 8-10-81	DRAWING NUMBER	80-556-A38
		APPROVED BY	8/11/81		



DAM CREST PROFILE
(LOOKING DOWNSTREAM)

NOTES:

1. DAM CREST WAS SURVEYED RELATIVE TO SPILLWAY CREST LEVEL.
2. DATUM ELEVATION AS PER DESIGN DRAWINGS

PLATE 5
ROSSITER DAM
DAM CREST SURVEY
FIELD INSPECTION DATE: JULY 16, 1981

D'APPOLONIA

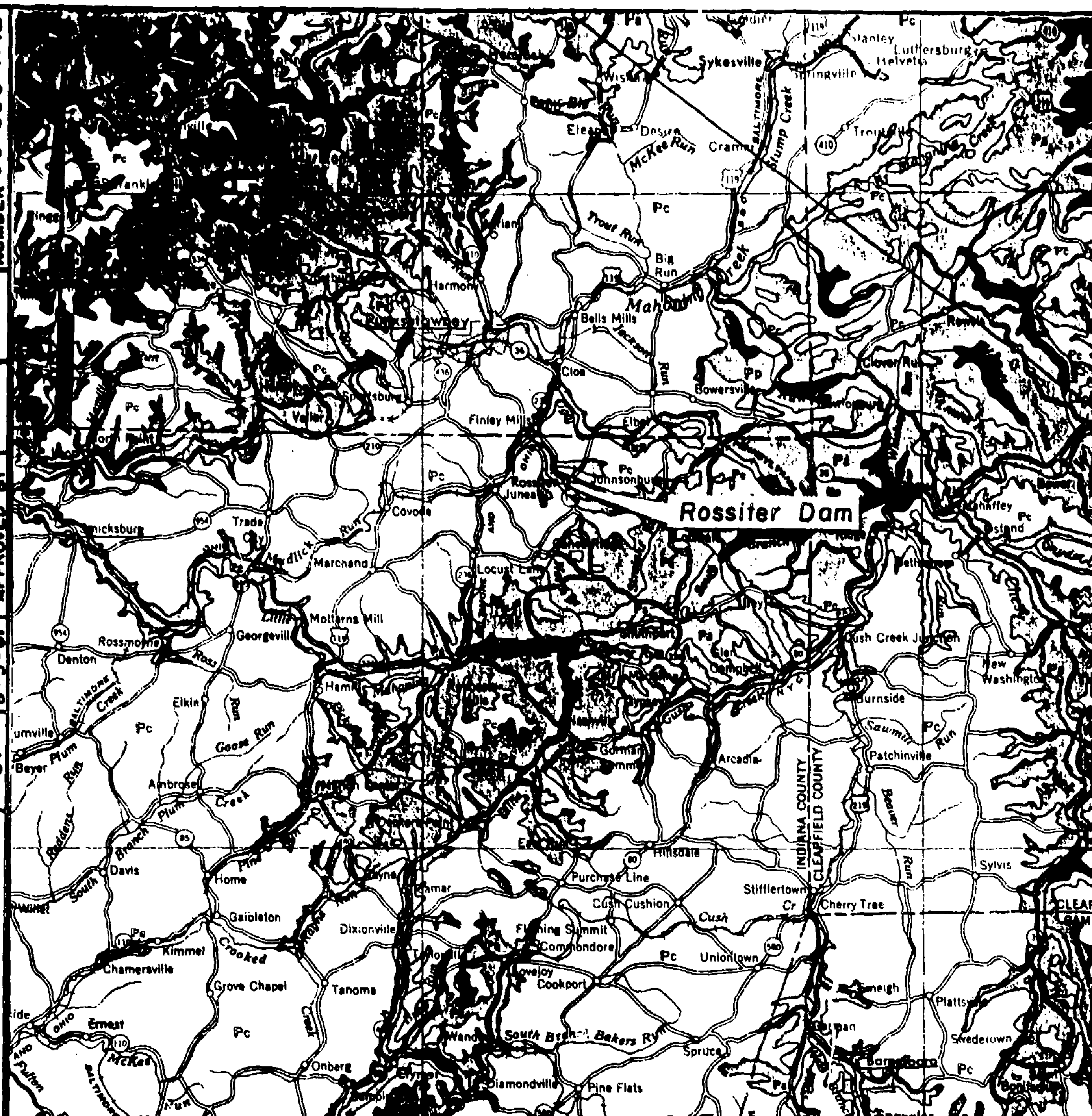
APPENDIX F

REGIONAL GEOLOGY

REGIONAL GEOLOGY
ROSSITER DAM

Rossiter Dam is located in the central area of the Appalachian Plateau Province which is characterized by broad, nearly level ridges and deep steep valleys. Strata in the area have been gently folded to form the Punxsutawney Syncline, a structural feature that trends to the northeast.

The dam lies near the contact of the Allegheny and Conemaugh groups of Pennsylvania Age. The Allegheny Group is primarily a sequence of shales and sandstones along with several minable coals. The Upper Freeport Coal delineates the Allegheny from the overlying Conemaugh which is characterized by variegated shales and thick sequences of coarse-grained sandstones. The lower half of the Conemaugh below the Ames Limestone contains numerous claystones that are prone to landslides.



SCALE

0 2 4 6 8 10 miles

REFERENCE:

GEOLOGIC MAP OF PENNSYLVANIA PREPARED BY COMMONWEALTH OF PENNA, DEPARTMENT OF ENVIRONMENTAL RESOURCES, DATED: 1960 SCALE 1:250,000

GEOLOGY MAP

D'APPOLONIA

DRAWN BY	ACS	CHECKED BY		APPROVED BY		DRAWING NUMBER
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	1-2-81	APPROVED BY	

DRAWING NUMBER 80-556-A4

2-17-81

2-17-81

PENNSYLVANIAN

APPALACHIAN PLATEAU

Allegheny Group
Cyclic sequences of sandstone, shale, limestone and coal; numerous commercial coals; limestones thicken westward; Vanport Limestone in lower part of section; includes Freeport, Kittanning, and Clarion Formations.

Pottsville Group
Predominantly sandstones and conglomerates with thin shales and coals; some coals mineable locally.

ANTHRACITE REGION

Ppd

Post-Pottsville Formations
Brown or gray sandstones and shales with some conglomerate and numerous mineable coals.

Pottsville Group
Light gray to white, coarse grained sandstones and conglomerates with some mineable coal; includes Sharp Mountain, Schuylkill, and Tumbling Run Formations.

MISSISSIPPIAN

Mauch Chunk Formation
Red shales with brown to greenish gray flaggy sandstones; includes Greenbrier Limestone in Fayette, Westmoreland, and Somerset counties; Loyalhanna Limestone at the base in southwestern Pennsylvania.

Pocono Group
Predominantly gray, hard, massive, cross-bedded conglomerate and sandstone with some shale; includes in the Appalachian Plateau Burgoon, Shenango, Cuyahoga, Cussewago, Corry, and Knapp Formations; includes part of "Oswayo" of M. L. Fuller in Potter and Tioga counties.

Pc

Conemaugh Formation
Cyclic sequences of red and gray shales and siltstones with thin limestones and coals; massive Mahoning Sandstone commonly present at base; Ames Limestone present in middle of section; Brush Creek Limestone in lower part of section.

DEVONIAN

UPPER

CENTRAL AND EASTERN PENNSYLVANIA

Oswayo Formation
Brownish and greenish gray, fine and medium grained sandstones with some shales and scattered calcareous lenses; includes red shales which become more numerous eastward. Relation to type Oswayo not proved.

Dck

Catskill Formation
Chiefly red to brownish shales and sandstones; includes gray and greenish sandstone tongues named Elk Mountain, Honesdale, Shohola, and Delaware River in the east.

Dm

Marine beds
Gray to olive brown shales, graywackes, and sandstones; contains "Chemung" beds and "Portage" beds including Burket, Brallier, Harrell, and Trimmers Rock; Tully Limestone at base.

Ds

Susquehanna Group
Barbed line is "Chemung-Catskill" contact of Second Pennsylvania Survey County reports; barbs on "Chemung" side of line.

GEOLOGY MAP LEGEND

REFERENCE:

GEOLOGIC MAP OF PENNSYLVANIA PREPARED BY COMMONWEALTH OF PENNA., DEPARTMENT OF ENVIRONMENTAL RESOURCES, DATED: 1960
SCALE 1:250,000

D'APPOLONIA

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